**Unpacked Content 2.01**

1. Graphic Images
   1. Graphics – anything on a page that is not actual text, from simple line drawings to fully active images found on the World Wide Web.
   2. Factors that Affect Graphic Choice
      1. Color depth refers to the number of colors per pixel that can be displayed in an image.
      2. Compression refers to how an image is saved in order to reduce the file size.
         1. The greater the compression, the lower the quality of the image.
         2. Lossless – no data is lost during compression.
         3. Lossy – some data is lost during compression.
      3. Portability – ease at which files are opened, modified, and viewed on computers using different operating systems, software and browsers.
      4. Transparency – the background of an image is “see-through” so that the graphic can blend into the background without having a white box around it.
2. Two Types of Graphics
   1. Raster Graphics – also called bitmap graphics.
      1. Images composed of grids of pixels that have a fixed resolution (number of pixels per inch) and cannot be resized without losing image quality.
      2. Raster graphics are edited in paint programs
      3. Formats used for Raster Graphics
         1. GIF – Graphics Interchange Format
            1. Characteristics

Standard format on web for animation

Supports transparency

Uses lossless compression

Supports 256 colors

* + - * 1. Commonly used for:

Clip art, animations, icons, logos

Simple diagrams, line drawings

Graphics with large blocks of a single color

Graphics with transparent areas

Graphics displayed on computer screens

* + - 1. JPEG – Joint Photographic Experts Group
         1. Characteristics

Does not support animation

Does not support transparency

Uses lossy compression

Supports 16 M colors

High quality; but larger file size than gif

* + - * 1. Commonly used for:

Desktop publishing images

Photographs and natural artwork

Scanned images

Emailing photographs

Digital camera photographs

* + - 1. BMP – Bitmap (Windows)
         1. Characteristics:

Does not support animation or transparency

Uncompressed

Supports 256 colors

Large file size; not well suited for transfer across the Internet or print publications

* + - * 1. Commonly used for:

Editing raster graphics

Creating icons and wallpaper

* + - 1. PNG – Portable Network Graphic
         1. Characteristics

Supports transparency

Uses lossless compression

Supports several different color depths; including 256 colors and 16 million colors

* + - * 1. Commonly used for:

Replacing GIF and TIFF images

Online viewing of images

* + - 1. TIFF – Tagged Image File Format
         1. Characteristics

Does not support animation or transparency

Available in compressed (lossless) and uncompressed formats

Supports up 16 M colors

* + - * 1. Commonly used for:

Storing raw bitmap data by some programs and devices such as scanners

High resolution printing

Desktop publishing images

Storage container for faxes and other digital images

* 1. Vector Graphics – composed of mathematical formulas that define lines, shapes and curves.
     1. Characteristics
        1. Shapes can be edited by moving points called nodes.
        2. Can be 2D or 3D
        3. Edited in draw programs
     2. Commonly used for:
        1. Graphics that will be scaled (or resized)
           1. Architectural drawings, CAD programs, flow charts
           2. Logos needing to be displayed in various sizes without degrading quality
        2. Cartoons and clip art
        3. Internet websites
        4. Fonts and specialized text effects
     3. Advantages
        1. Resolution independent – regardless of how much the image is enlarged or reduced, the image definition and quality remain the same
        2. Small file sizes – easily transferred over the Internet
     4. Disadvantages
        1. Lower color quality than bitmap images
        2. Not good for photographic images
     5. Common Vector File Formats
        1. AI – Adobe Illustrator
        2. CDR – Corel Draw
        3. DXF – AutoCAD
        4. EPS – Encapsulated Postscript (meta graphic)
        5. SVG – Scalable Vector Graphics
        6. WMF – Windows Metafile, common format for windows clipart

NOTE: Meta graphic formats can contain both vector and raster data.

1. Raster vs Vector
   1. Vector graphics do not degrade in quality when scaled (resized)
   2. Raster graphics become pixilated when enlarged
   3. Vector graphics are easier to color than raster graphics
   4. Vector file are smaller than raster files
   5. Vector images can easily be converted to raster images but raster images are hard to convert to vector images.
   6. Raster graphics are better for realistic images and photographs
2. Types of Images
   1. Clip Art – premade graphics that are available online and in many software packages; may be vector or raster
   2. Photographs – raster images that contain millions of colors.
   3. Art Work – computer created drawing or painting; may be raster or vector
3. Resolution – the amount of detail stored for an image. The higher the resolution, the higher the level of detail in the image.
   1. PPI – pixels per inch
      1. The number of pixels in one inch
      2. More pixels per inch means better image quality but larger file size.
      3. Images that will be displayed on a monitor or screen can have a lower resolution because most monitors/screens do not support very high resolutions.
   2. DPI – dots per inch
      1. The number of dots of ink or toner per inch on a printed image.
      2. The lower the DPI the less detailed the image.
      3. Images that will be printed need a higher resolution in order to print clearly without pixelation or blurriness.
4. Image Editing
   1. Aspect Ratio – relationship of an object’s width to its height
   2. Cloning – copying part of an image and using it to replace unwanted parts of the image.
   3. Cropping – removing a part of an image
      1. The original image retains the same file size
      2. The cropped image can be saved as a new object
   4. Filters – used to apply special effects to an image
   5. Gradients – filling an object with a smooth transition from one color to another.
   6. Layering – compiling multiple pictures or objects together into one image
      1. Layers can be turned on or off
      2. Elements can be colored, layered, and resized individually
   7. Patterns and Textures
      1. Patterns are raster graphics applied as a fill
      2. Textures are used to create filters and backgrounds
   8. Rotating – pivoting an object around its center point
   9. Transparency – removing the background color of a raster image making it “see-through” in order to allow the image to blend in with its background.

2.02

**Unpacked Content 2.02**

1. Introduction
   1. Animation – simulation of movement created by rapidly displaying images or frames.
      1. Relies on persistence of vision – the way our eyes retain images for a split second longer than they actually appear which makes quick flashes of images appear as one continuous motion.
      2. Frame by Frame Animation - the rapid display of a sequence of still images (2D or 3D) or models in order to create the optical illusion of movement.
      3. Example: Flipbook
2. History of Animation
   1. Traditional Animation Process
      1. Storyboards are created.
      2. The preliminary soundtrack is recorded.
      3. Keyframes are drawn by lead animators.
      4. Pencil testing is performed to match keyframes to the soundtrack.
      5. In-between frames are drawn to fill-in between the keyframes.
      6. Drawings are traced onto plastic cels and painted.
      7. Cels are photographed onto film.
   2. Computer Assisted Animation
      1. Follows the same steps as traditional animation but the computer performs some of the work.
      2. Images or frames can be scanned into the computer or created by artists using graphics tablets.
      3. Pencil testing can be performed on the computer.
      4. Tweening can be performed by the computer.
   3. Computer Generated Animation
      1. All the animation and images are created on the computer.
      2. Special software is used to create these animations.
      3. Can use motion capture – actors wear special suits to allow the computer to copy their motions and apply them to 3D models created on the computer.
3. Uses of Animation
   1. Advertising – used to catch attention, such as banners on websites.
   2. Entertainment – films, games, virtual reality
   3. Selling – showcasing products, services or instructions
   4. Teaching – illustrating concepts or processes
   5. Training – simulations, presentations, etc.
   6. Use Animation Appropriately
      1. Is it appropriate for the target audience?
      2. Does it help deliver the message?
      3. Is it overused?
      4. Does it load quickly?
4. Methods of Animating – digital animation is based on the frame by frame process.
   1. Morphing – transforming one object into another.
      1. The user inserts the beginning image.
      2. The user inserts the ending image.
      3. The computer tweens the frames between the two.
   2. Path Based Animation – also called vector animation.
      1. The user inserts an object and draws a path (or vector).
      2. The computer tweens, or creates the frames, to move the object along the path.
      3. Vector or raster graphics can be used.
      4. File sizes can be reduced if vector graphics are used.
   3. Programming or Scripting-Based Animation
      1. Requires knowledge of programming or scripting languages.
      2. Example
         1. Rollovers – also called mouseovers. When the mouse is moved over an image, it changes to a different image.
         2. Created by using scripting languages such as Javascript.
         3. Used for menus on webpages, CDs and DVDs.
   4. Stop Motion Animation – manipulating real-world objects and photographing them one frame at a time. Example: Clay Animation
   5. Animation Software
      1. 3DS Max
      2. Adobe PhotoShop and Flash
      3. Blender
      4. Cinema 4D
      5. Maya
5. Creating a Computer Animation Using Animation Software
   1. Parts of an Animation Program
      1. Stage – part of program where the content is created and manipulated.
      2. Library – used to store frequently used files.
      3. Timeline – used to organize the content
         1. Frame – one individual image in an animation.
         2. Keyframe – indicates where an action is to occur.
         3. Layers – the timeline can be divided into different layers to give the author more control over different elements such as sound and text.
         4. Playhead – the vertical red marker in the timeline that shows which frame is the current frame as the animation plays.
         5. Scrubbing – dragging the playhead across the timeline in order to preview the animation.
   2. Guidelines for Designing Animations
   3. Copyright Laws
   4. Create Animations
   5. Add Sound
   6. Animate Text
6. Publishing Animations
   1. Analyze and Optimize the Animation
   2. Animation File Types
      1. Animated Gif
      2. AVI
      3. MOV
      4. MPEG
      5. SWF
   3. Methods for Publishing Animated Videos
      1. Website
      2. CD-ROM or DVD
      3. Executable File
   4. Plugins/Players – may be required to view an animation over the Internet.
      1. Plugins are programs that work with the browser to expand its capabilities, such as allow it to play video or open certain file types.
      2. Standalone Players – many plugins can also operate as standalone programs meaning they will open and work without the browser software being open.
      3. Examples:
         1. Adobe Flash Player
         2. QuickTime
         3. RealPlayer
         4. Windows Media Player
   5. Factors that Influence the Delivery of Animations
      1. Bandwidth - the amount of data that can be transmitted over a network in a given amount of time.
      2. Playback Rate - the number of frames per second that are shown when the animation is played.
      3. Streaming Rate - the number of frames per second contained in the animation.